

1/9

HPV 52 L1 Nucleotide Sequence Alignment

52 L1 wt	(1)	ATGTCCGTGTGGCGGCCTAGTGAGGCCACTGTGTACCTGCCTCCTGTACC
52 L1 R		.....C...A.A..ATCC..A..T... .C...T....A..A...T..
52 L1 wt	(51)	TGTCTCTAAGGTTGTAAGCACTGATGAGTATGTGTCTCGCACAAGCATCT
52 L1 R		A.....CTCT..C..C..A..C. .C..CA.A..CTC.....
52 L1 wt	(101)	ATTATTATGCAGGCAGTTCTCGATTACTAACAGTAGGACATCCCTATTTT
52 L1 R		.C..C..C..T..TTCC...A....GT.G. .T..C..T..C..A..C..C
52 L1 wt	(151)	TCTATTAAAAACACCAGTAGTGGAATGGTAAAAAAGTTTTAGTTCCCAA
52 L1 R		.....C..G.....TCCTCC.....C.... .G..G..C..G.....A..
52 L1 wt	(201)	GGTGTCTGGCCTGCAATACAGGGTATTTAGAATTAAATTGCCGGACCCTA
52 L1 R		...C.....TT.....A..C..C... .C..G.....A.....A.
52 L1 wt	(251)	ATAAATTTGGTTTTCCAGATACATCTTTTTATAACCCAGAAACCCAAAGG
52 L1 R		.C..G..C.....C.....C..TAG...C. .C.....T.....A
52 L1 wt	(301)	TTGGTGTGGGCCTGTACAGGCTTGGAATTGGTAGGGGACAGCCTTTAGG
52 L1 R		.....C.....T.....T.....C.....A..T..A..A..G..
52 L1 wt	(351)	TGTGGGTATTAGTGGGCATCCTTTATTAAACAAGTTTGATGATACTGAAA
52 L1 R		...C.....CTC...T..C..A..G..G.. .C..C..C.....
52 L1 wt	(401)	CCAGTAACAAATATGCTGGTAAACCTGGTATAGATAATAGGGAATGTTTA
52 L1 R		..TC.....G..C.....G..A.... .C.....C..A.....G
52 L1 wt	(451)	TCTATGGATTATAAGCAGACTCAGTTATGCATTTTAGGATGCAAACCTCC
52 L1 R		.....C..C.....A.....A..G..T. .C..G..T..T..G..A..
52 L1 wt	(501)	TATAGGTGAACATTGGGGTAAGGGAACCCCTTGTAATAATAATTCAGGAA
52 L1 R		A..C.....C.....T..T..A.....C..C..C..T..T.
52 L1 wt	(551)	ATCCTGGGGATTGTCCTCCCTACAGCTCATTAACAGTGTAAATACAGGAT
52 L1 R		.C..A..T..C.....A..AT.G..AT.G. .C...TCC..C..C..A..C
52 L1 wt	(601)	GGGGACATGGTAGATACAGGATTTGGTTGCATGGATTTTAATACCTTGCA
52 L1 R		..T.....C..C..T..T..C.....T.....C..C..C.....

FIG. 1A

2/9

52 L1 wt	(651)	AGCTAGTAAAAGTGATGTGCCATTGATATATGTAGCAGTGTATGTAAGT
52 L1 R		....TC...GTCC..C..C..A..C..C..C...TC.TC... C.....
52 L1 wt	(701)	ATCCAGATTATTTGCAAATGGCTAGCGAGCCATATGGTGACA GTTTGTTC
52 L1 R		.C.....C..C.....TCT..A.....C.....TCC.....
52 L1 wt	(751)	TTTTTCTTAGACGTGAGCAAATGTTTGTAGACACTTTTTT AATAGGGC
52 L1 R		..C..CT.G...A.A..A.....C..C.....C..C..C..A..
52 L1 wt	(801)	CGGTACCTTAGGTGACCCTGTGCCAGGTGATTTATATATACA AGGGTCTA
52 L1 R		T.....G.....A..T.....C..G..C..C... ..T..C.
52 L1 wt	(851)	ACTCTGGCAATACTGCCACTGTACAAAGCAGTGCTTTTTTTC CTACTCCT
52 L1 R		.....T..C.....T.....C...TC.TC.....C..C. .A.....A
52 L1 wt	(901)	AGTGGTTCTATGGTAACCTCAGAATCCCAATTATTTAATAAA CCGTACTG
52 L1 R		TC.....C.....C.....C.....G..C..C..G..A.....
52 L1 wt	(951)	GTTACAACGTGCGCAGGGCCACAATAATGGCATATGTTGGGG CAATCAGT
52 L1 R		...G...A.A..T..A..T.....C..C..T..C.....T..C..A.
52 L1 wt	(1001)	TGTTTGTACAGTTGTGGATACCACTCGTAGCACTAACATGA CTTTATGT
52 L1 R		....C.....C..C..C..C..T...A.ATCT.....C..G...
52 L1 wt	(1051)	GCTGAGGTTAAAAAGGAAAGCACATATAAAAATGAAAATTTT AAGGAATA
52 L1 R		.....A..C..G.....TC...C..C..G..C.....C..C
52 L1 wt	(1101)	CCTTCGTCATGGCGAGGAATTTGATTTACAATTTATTTTCA ATTGTGCA
52 L1 R		.T.GA.A..C..T..A.....C..C..G.....C..C..C... ..T.
52 L1 wt	(1151)	AAATTACATTAACAGCTGATGTTATGACATACATTCATAAGATGGATGCC
52 L1 R		.G..C..C..G..C.....C..C.....T.....C..C.... ..C..T
52 L1 wt	(1201)	ACTATTTTAGAGGACTGGCAATTTGGCCTTACCCACCCACCGTCTGCATC
52 L1 R		.....C..G..A.....C..TT.G..T.....A..C..T..
52 L1 wt	(1251)	TTTGGAGGACACATACAGATTTGTCACCTTCTACTGCTATAACTTGTCAAA
52 L1 R		C.....A.....T.....C.....C.....C..C.....

FIG.1A

3/9

52 L1 wt	(1301)	AAAACACGCCACCTAAAGGAAAGGAAGATCCTTTAAAGGACTATA TGTTT
52 L1 R		.G.....T.....A..G..T.....C..A..G.....C... ..C
52 L1 wt	(1351)	TGGGAGGTGGATTTAAAGAAAAGTTTTCTGCAGATTAGATCAGTTTCC
52 L1 R		.....A..C..C..G..G.....C.....T..C..G..C..A..C..
52 L1 wt	(1401)	TTTAGGTAGGAAGTTTTTGTACAGGCAGGGCTACAGGCTAGGCCCAAAC
52 L1 R		A..G.....A.....C.....G..A..T..TT.G..A.....A..A..GT
52 L1 wt	(1451)	TAAACGCCCTGCATCATCGGCCCCACGTACCTCCACAAAGAAGA AAAAG
52 L1 R		.G..GA.A..A..TAGC..T..T...A.A..T.....C..... .G...
52 L1 wt	(1501)	GTAAAAGGTAA (SEQ ID NO:3)
52 L1 R		..C..G..A...(SEQ ID NO:1)

FIG.1C

4/9

HPV 52 L1 R Nucleotide and Amino Acid Sequences

	M	S	V	W	R	P	S	E	A	T	V	Y	L	P	P	V	P
1	ATGTCCGTCT	GGAGACCATC	CGAAGCTACT	GTCTACTTGC	CACCAGTTCC												
	TACAGGCAGA	CCTCTGGTAG	GCTTCGATGA	CAGATGAACG	GTGGTCAAGG												
	G S K	V V S T	D E Y	V S R	T S I Y												
51	AGTCTCTAAG	GTTGTCTCTA	CCGACGAATA	CGTCTCCAGA	ACCTCCATCT												
	TCAGAGATTC	CAACAGAGAT	GGCTGCTTAT	GCAGAGGTCT	TGGAGGTAGA												
	Y Y A	G S S	R L L T	V G H	P Y F												
101	ACTACTACGC	TGGTTCCTCT	AGATTGTTGA	CTGTCCGGTCA	CCCATACTTC												
	TGATGATGCG	ACCAAGGAGA	TCTAACAAC	GACAGCCAGT	GGGTATGAAG												
	S I K N	T S S	G N G	K K V L	V P K												
151	TCTATCAAGA	ACACCTCCTC	CGGTAACGGT	AAGAAGGTCT	TGGTTCCAAA												
	AGATAGTTCT	TGTGGAGGAG	GCCATTGCCA	TTCTTCCAGA	ACCAAGGTTT												
	V S G	L Q Y R	V F R	I K L	P D P N												
201	GGTCTCTGGT	TTGCAATACA	GAGTCTTCAG	AATCAAGTTG	CCAGACCCAA												
	CCAGAGACCA	AACGTTATGT	CTCAGAAGTC	TTAGTTCAAC	GGTCTGGGTT												
	K F G	F P D	T S F Y	N P E	T Q R												
251	ACAAGTTCGG	TTTCCCAGAC	ACTAGTTTCT	ACAACCCAGA	AACTCAAAGA												
	TGTTCAAGCC	AAAGGGTCTG	TGATCAAAGA	TGTTGGGTCT	TTGAGTTTCT												
	L V W A	C T G	L E I	G R G Q	P L G												
301	TTGGTCTGGG	CTTGTACTGG	TTTGGAAATC	GGTAGAGGTC	AACCATTGGG												
	AACCAGACCC	GAACATGACC	AAACCTTTAG	CCATCTCCAG	TTGGTAACCC												
	V G I	S G H P	L L N	K F D	D T E T												
351	TGTCGGTATC	TCTGGTCACC	CATTGTTGAA	CAAGTTCGAC	GACACTGAAA												
	ACAGCCATAG	AGACCAAGTGG	GTAACAAC	GTTCAAGCTG	CTGTGACTTT												
	S N K	Y A G	K P G I	D N R	E C L												
401	CCTCTAACAA	GTACGCTGGT	AAGCCAGGTA	TCGATAACAG	AGAATGTTTG												
	GGAGATTGTT	CATGCGACCA	TTCCGTCCAT	AGCTATTGTC	TCTTACAAAC												
	S M D Y	K Q T	Q L C	I L G C	K P P												
451	TCTATGGACT	ACAAGCAAAC	TCAATTGTGT	ATCTTGGGTT	GTAAGCCACC												
	AGATACCTGA	TGTTTCGTTTG	AGTTAACACA	TAGAACCCAA	CATTCCGGTGG												
	I G E	H W G K	G T P	C N N	N S G N												
501	AATCGGTGAA	CACTGGGGTA	AGGGTACTCC	ATGTAACAAC	AACTCTGGTA												
	TTAGCCACTT	GTGACCCCAT	TCCCATGAGG	TACATTGTTG	TTGAGACCAT												
	P G D	C P P	L Q L I	N S V	I Q D												
551	ACCCAGGTGA	CTGTCCACCA	TTGCAATTGA	TCAACTCCGT	CATCCAAGAC												
	TGGGTCCACT	GACAGGTGGT	AACGTTAACT	AGTTGAGGCA	GTAGGTTCTG												
	G D M V	D T G	F G C	M D F N	T L Q												
601	GGTGACATGG	TCGACACTGG	TTTCGGTTGT	ATGGACTTCA	ACACCTTGCA												
	CCACTGTACC	AGCTGTGACC	AAAGCCAACA	TACCTGAAGT	TGTGGAACGT												

FIG.2A

5/9

A S K S D V P I D I C S S V C K Y
 651 AGCTTCTAAG TCCGACGTCC CAATCGACAT CTGTTCTCT GTCTGTAAGT
 TCGAAGATTC AGGCTGCAGG GTTAGCTGTA GACAAGGAGA CAGACATTCA
 P D Y L Q M A S E P Y G D S L F
 701 ACCCAGACTA CTTGCAAATG GCTTCTGAAC CATA CGGTGA CTCCTTGTTT
 TGGGTCTGAT GAACGTTTAC CGAAGACTTG GTATGCCACT GAGGAACAAG
 F F L R R E Q M F V R H F F N R A
 751 TTCTTCTTGA GAAGAGAACA AATGTTCTGTC AGACACTTCT TCAACAGAGC
 AAGAAGAACT CTTCTCTTGT TTACAAGCAG TCTGTGAAGA AGTTGTCTCG
 G T L G D P V P G D L Y I Q G S N
 801 TGGTACCTTG GGTGACCCAG TTCCAGGTGA CTTGTACATC CAAGGTTCCA
 ACCATGGAAC CCACTGGGTC AAGGTCCACT GAACATGTAG GTTCCAAGGT
 S G N T A T V Q S S A F F P T P
 851 ACTCTGGTAA CACTGCTACT GTCCAATCCT CTGCTTTCTT CCCAACTCCA
 TGAGACCATT GTGACGATGA CAGGTTAGGA GACGAAAGAA GGGTTGAGGT
 S G S M V T S E S Q L F N K P Y W
 901 TCTGGTTCCA TGGTCACCTC CGAATCCCAA TTGTTCAACA AGCCATACTG
 AGACCAAGGT ACCAGTGGAG GCTTAGGGTT AACAAGTTGT TCGGTATGAC
 L Q R A Q G H N N G I C W G N Q L
 951 GTTGCAAAGA GCTCAAGGTC ACAACAACGG TATCTGTTGG GGTAACCAAT
 CAACGTTTCT CGAGTTCCAG TGTTGTTGCC ATAGACAACC CCATTGGTTA
 F V T V V D T T R S T N M T L C
 1001 TGTTCTGTCAC CGTCGTCGAC ACTACTAGAT CTACTAACAT GACCTTGTGT
 ACAAGCAGTG GCAGCAGCTG TGATGATCTA GATGATTGTA CTGGAACACA
 A E V K K E S T Y K N E N F K E Y
 1051 GCTGAAGTCA AGAAGGAATC CACCTACAAG AACGAAAAC TCAAGGAATA
 CGACTTCAGT TCTTCCTTAG GTGGATGTTT TTGCTTTTGA AGTTCCTTAT
 L R H G E E F D L Q F I F Q L C K
 1101 CTTGAGACAC GGTGAAGAAT TCGACTTGCA ATTCATCTTC CAATTGTGTA
 GAACTCTGTG CCACTTCTTA AGCTGAACGT TAAGTAGAAG GTTAACACAT
 I T L T A D V M T Y I H K M D A
 1151 AGATCACCTT GACCGCTGAC GTCATGACTT ACATCCACAA GATGGACGCT
 TCTAGTGGA CTGGCGACTG CAGTACTGAA TGTAGGTGTT CTACCTGCGA
 T I L E D W Q F G L T P P P S A S
 1201 ACTATCTTGG AAGACTGGCA ATTCGGTTTG ACTCCACCAC CATCCGCTTC
 TGATAGAACC TTCTGACCGT TAAGCCAAAC TGAGGTGGTG GTAGGCGAAG
 L E D T Y R F V T S T A I T C Q K
 1251 CTTGGAAGAC ACTTACAGAT TCGTCACTTC CACTGCTATC ACCTGTCAAA
 GAACCTTCTG TGAATGTCTA AGCAGTGAAG GTGACGATAG TGGACAGTTT

FIG.2B

6/9

N T P P K G K E D P L K D Y M F
1301 AGAACACTCC ACCAAAGGGT AAGGAAGACC CATTGAAGGA CTACATGTTC
TCTTGTGAGG TGGTTTCCCA TTCCTTCTGG GTAACCTCCT GATGTACAAG
W E V D L K E K F S A D L D Q F P
1351 TGGGAAGTCG ACTTGAAGGA AAAGTTCTCT GCTGACTTGG ACCAATTCCC
ACCCTTCAGC TGAACCTCCT TTTCAAGAGA CGACTGAACC TGGTTAAGGG
L G R K F L L Q A G L Q A R P K L
1401 ATTGGGTAGA AAGTTCTTGT TGCAAGCTGG TTTGCAAGCT AGACCAAAGT
TAACCCATCT TTCAAGAACA ACGTTCGACC AAACGTTCGA TCTGGTTTCA
K R P A S S A P R T S T K K K K
1451 TGAAGAGACC AGCTAGCTCT GCTCCAAGAA CTTCCACCAA GAAGAAGAAG
ACTTCTCTGG TCGATCGAGA CGAGGTTCTT GAAGGTGGTT CTTCTTCTTC
V K R * (SEQ ID NO:2)
1501 GTCAAGAGAT AA (SEQ ID NO:1)
CAGTTCTCTA TT (SEQ ID NO:7)

FIG.2C

7/9

Expression of HPV 52 L1 wt and 52 L1 R Transcripts

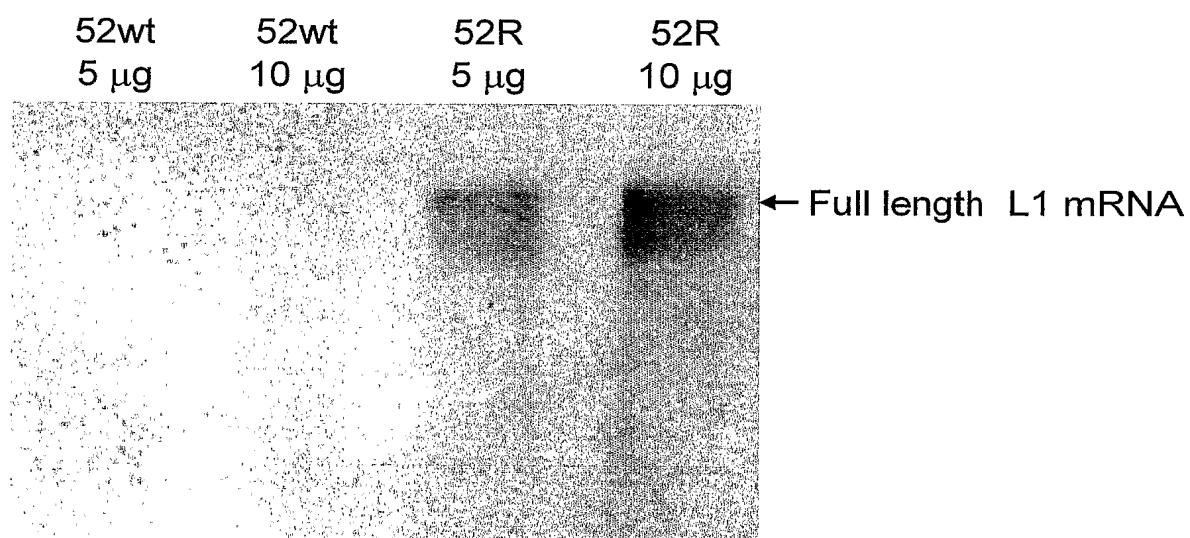


FIG.3

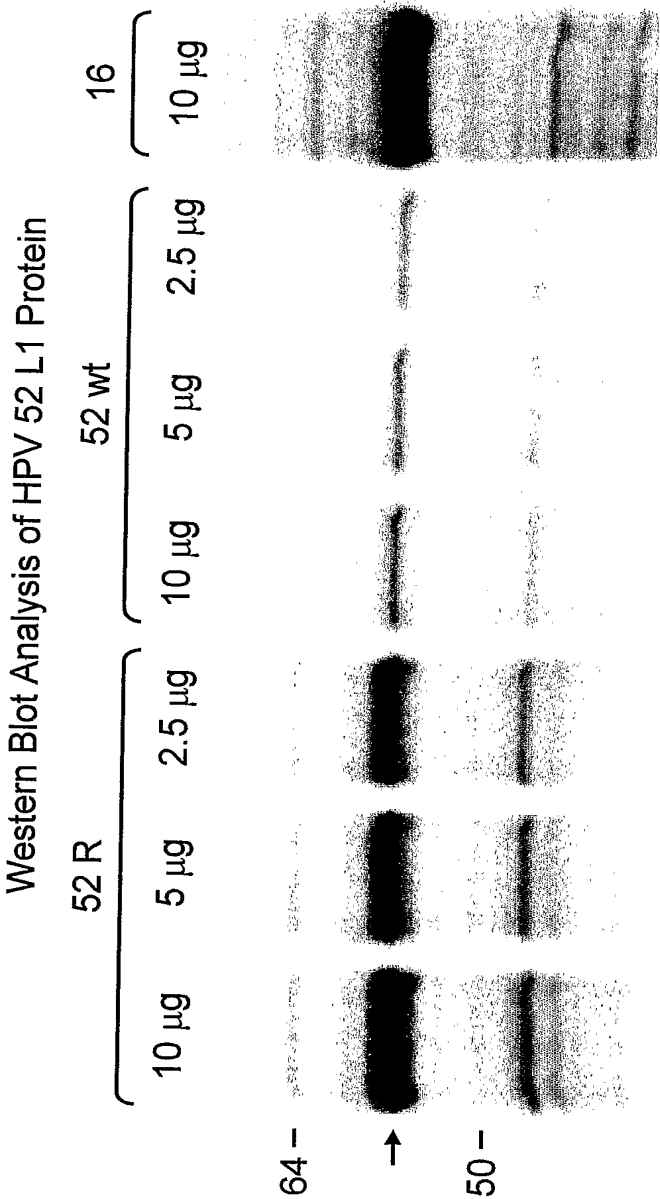


FIG.4

Transmission EM of VLPs Composed of HPV 52 L1 R Protein Molecules

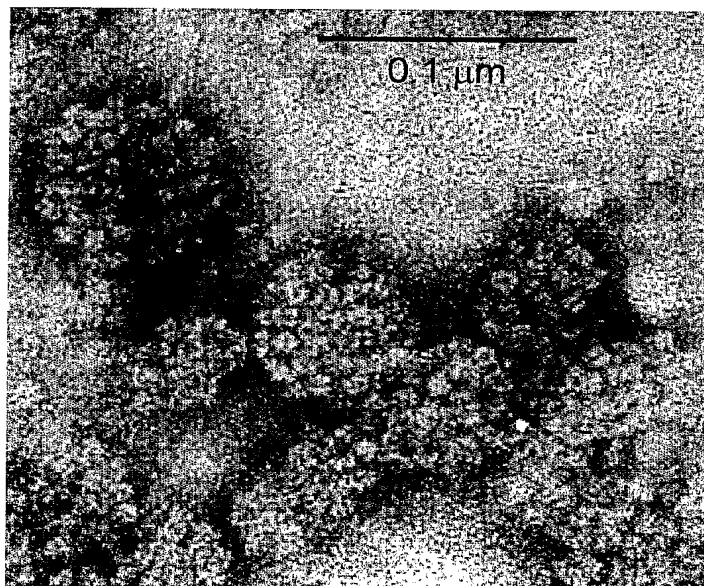


FIG.5